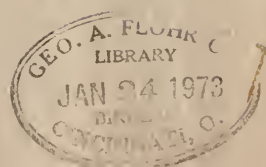
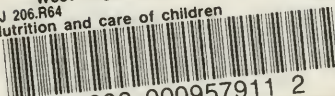


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U. S. DEPARTMENT OF LABOR

JAMES J. DAVIS, Secretary

CHILDREN'S BUREAU

GRACE ABBOTT, Chief

# THE NUTRITION AND CARE OF CHILDREN IN A MOUNTAIN COUNTY OF KENTUCKY

By

LYDIA ROBERTS



Bureau Publication No. 110



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## LETTER OF TRANSMITTAL.

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JUNE 14, 1922.

SIR: There is transmitted herewith a report on the Nutrition and Care of Children in a Mountain County of Kentucky, by Lydia Roberts. The physical examinations were made by Dr. Frances Sage Bradley, assisted by E. Ida McCune, and Ethel M. Springer assisted in the direction of the field work. The visiting of the homes was done by Ella Ross and Alta Nelson. The investigation was planned by Miss Roberts, and the report written by her.

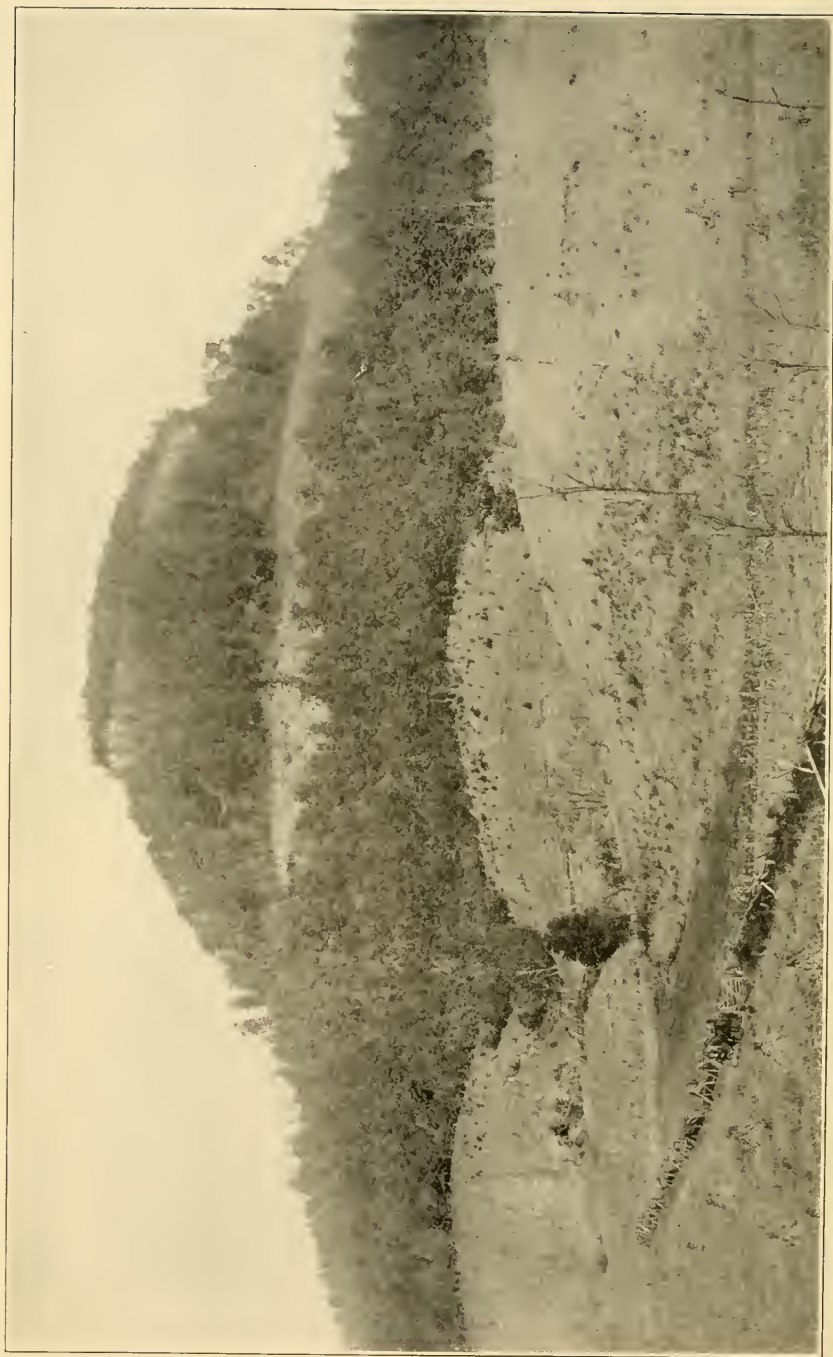
Respectfully submitted.

GRACE ABBOTT, *Chief.*

HON. JAMES J. DAVIS,  
*Secretary of Labor.*







TYPICAL "KNOB."

Note layer of limestone near the top.

# THE NUTRITION AND CARE OF CHILDREN IN A MOUNTAIN COUNTY OF KENTUCKY.

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## INTRODUCTION.

### PURPOSE OF STUDY.

This report covers the findings of the first nutrition survey undertaken by the Children's Bureau in a rural district. Other rural studies have dealt with maternity and infant care, and the general conditions surrounding young children,<sup>1</sup> and some of them have revealed data of interest in connection with the nutrition of children, but in none was nutrition the chief object of the investigation. The study was made in a community in Kentucky in response to an appeal from the Kentucky State Board of Health to help find "why a State famous the world over for its prosperity should turn out so large a percentage of physically defective men as the draft records showed." Its purpose was to ascertain the physical condition of children of selected ages and to discover, if possible, the chief factors responsible for the conditions found. The field work was done in the winter of 1919-20.

### THE COMMUNITY STUDIED.

Kentucky is distinctly a rural State, its urban population, according to the 1920 census, being 633,543, while its rural population was almost three times that number. The State board of health suggested a study of five typical counties in different parts of the State in order to secure a representative picture. Unfortunately, such an extended survey could not be undertaken. Instead a county was chosen which had two distinct types of country, a blue-grass section and a mountain section, and later it became necessary to limit the survey to the latter only, a section embracing an area of about 30 square miles. Every home within this area having a child between 2 and 11 years of age was visited. These years were chosen because it was desired to exclude the periods of infancy and puberty, which

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<sup>1</sup> Maternity and Infant Care in a Rural County in Kansas, U. S. Children's Bureau Publication No. 26, Washington, 1917; Rural Children in Selected Counties of North Carolina, U. S. Children's Bureau Publication No. 33, Washington, 1918; Maternity Care and the Welfare of Young Children in a Homesteading County in Montana, U. S. Children's Bureau Publication No. 34, Washington, 1919; Maternity and Infant Care in Two Rural Counties in Wisconsin, U. S. Children's Bureau Publication No. 46, Washington, 1919; Maternity and Child Care in Selected Rural Areas of Mississippi, U. S. Children's Bureau Publication No. 88, Washington, 1921.



involve special problems it was not deemed expedient to consider. In all, 123 families, with 256 children of the selected age, were interviewed.<sup>a</sup>

In a nutrition study in a rural community, the physiography and soil assume great importance not only because the food supply is directly dependent on them but also because they almost entirely determine economic status. Rich farming land presupposes an abundant food supply and financial prosperity, while hilly, stony soil usually means uncertain, meager crops and a struggle to obtain the necessities of life.

The county in which the area studied is located contains within its borders extremes of richness and of poverty of soil. The greater part of the county is in the blue-grass section where the soil is of great fertility, but a small portion of it extends into "the knobs," or "the mountains," as the rocky cone-shaped hills are called, where the soil is for the most part exceedingly poor. It was this small, mountainous part which constituted the area studied.

The farms of the area are of three types, depending on their location. The lowland just at the foot of the mountains is the poorest soil in the district. It rests upon a bed of shale only a few feet from the surface. This land is wet and sour and needs drainage, ground limestone, and phosphorus. Plenty of limestone lies near at hand, for "the knobs" are composed largely of limestone and near their tops are found massive outcroppings of the rock; if this rock could be pulverized and put on the land below it would be the greatest possible boon to the soil. Up to the time of this study, however, rock crushers were not available. On the sides of the mountains between the limestone and the lower shale land are farms far better than those of the lower land. The soil is better drained, and is enriched by washings from the limestone areas above. The third type of farm is found on the tops of some of the knobs. Here the soil is more nearly comparable than any other in the surveyed area to the soil of the blue-grass region, since it rests upon a limestone bed which by slow disintegration supplies the needed lime. As a rule, therefore, the better farms in this section are the upland farms, although similar to these in fertility are the patches of bottom lands with rich productive soil which has been formed by overflows of creeks and the consequent deposition of sediment. It is evident that the economic status of a family in the area studied can be predicted fairly accurately from the location of its farm.

Although the chief crop of the section is corn, only enough is produced for local needs. The average yield is about 15 bushels per

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<sup>a</sup> In discussion of material based upon these interviews, cases not reported as to the particular item under consideration, usually not more than two or three in number, are omitted. The per cents are based upon the total number of cases.



acre, though some farms in the section yield considerably higher than this average, and some yield as little as 5 bushels. Other crops include tobacco,<sup>2</sup> oats, and rye in limited amounts, cowpeas, and sorghum. The upland soil is adapted to fruit culture, and a few of the progressive farmers of the section have planted orchards. In spite of the fact that frosts may kill the crop for a number of years in succession, a good yield once in five or six years, in the opinion of experts, makes fruit growing well worth while.

That poor roads and lack of development in a community go hand in hand is probably nowhere better illustrated than in the locality studied. The roads over which the majority of the people have to travel to get to market are almost universally poor. Although none of the families visited lived farther than about 7 miles from a fair-sized town, many were as isolated as if the distance were several times as great. For them to get to town was at certain seasons not only a long, laborious task, but often for prolonged periods an absolutely impossible one.

The 123 families visited in this survey were all native white and with very few exceptions were of mountain stock. Poor roads had tended to isolate them, although they lived within a few miles of a small town with railroad and educational advantages, which no doubt had influenced them to a certain extent. Their natural shyness and reserve, a heritage from many generations of mountain ancestors, has made them slow in responding to outside influences.

A visitor to the mountains never fails to be impressed by the premature ageing of the majority of the people, particularly the women. The early age at which the women marry and assume the cares of a home and family doubtless offers a partial explanation of this fact.

#### METHOD OF STUDY.

A nutrition survey necessarily consists of two parts: First, a study of the physical condition of the children to determine their state of nutrition and to discover any clinical factors which may be either the result or the cause of poor nutrition; second, an examination into the factors of diet and care responsible for the condition of health in which the children are found. In the present study the children's physical condition was ascertained by means of a medical examination made by a doctor on the staff of the Children's Bureau, and information concerning their diet and care was gathered through interviews with the mothers in their homes by agents who were specialists in food and nutrition. A schedule covering the information to be

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<sup>2</sup>Although the soil in general is not adapted to raising tobacco, the farmers had found in their baru lots and dooryards small plots of 1 to 1½ acres which could be used temporarily for this crop.

sought from a mother regarding the diet and care of her children was prepared, and general items of importance in a consideration of the nutrition and general health of the children were also included.<sup>3</sup> The visiting of the homes was done first, because this part of the study required more time, and because it also gave opportunity to explain to the mothers the purpose and value of the physical examination which formed the second part of the inquiry.

It was usually the mother but sometimes the father who was interviewed by the agent of the Children's Bureau. Often, indeed, the two answered the questions together, the mother supplying the information about the child's personal habits and the father contributing facts about the garden, the milk, and general farm matters. As a rule the agent's visit was expected, for contact had already been made with the children through the school, and word concerning the purpose of the inquiry and the intention of the agents to visit the parents had been carried home. The reception of the agents in the homes was invariably courteous, and answers to all the questions were freely given.

Whatever difficulties arose in securing accurate data came not from unwillingness on the part of the mothers to give the information but from the fact that they did not know their children's habits, particularly in regard to food. "I put the food on the table; I don't pay no 'tention to what nobody eats," was a not infrequent response. The mother, however, always knew what she had cooked, and she usually knew what the younger children ate, and the older children could supply the needed data regarding their own food. Since the agents were specialists in nutrition, they were able to supplement the schedule inquiries by further questions regarding essential points. It is believed, therefore, that the information secured is as accurate as can be obtained by the schedule method.

After the home visits were completed, the Children's Bureau "Child-Welfare Special" came to the locality in order that the children studied might be physically examined. The "special" is a large automobile truck fitted up as a health center and equipped with scales, measuring devices, and other facilities needed by a physician in giving a complete physical examination. A doctor, a nurse, and a clerk travel with the car.<sup>4</sup>

The "special" visited certain schoolhouses in the district, and the mothers were notified in advance, by letter usually, when and where to bring their children. Most of them when visited had seemed interested in having their children examined when the car should arrive, but persistent rain, muddy and impassable roads, lack of

<sup>3</sup> See schedule, following p. 41.

<sup>4</sup> The Child-Welfare Special. U. S. Children's Bureau Publication No. 69. Washington, 1920.

conveyance, illness, and, in some cases, inadequate clothing for the children kept many of them away. However, 149 children—a little more than half the number for whom schedules were obtained—reported for examination. Of those who arrived not a few struggled through great difficulties. One mother walked several miles in the rain carrying a baby, while the three older children trudged along in the mud beside her; another was obliged to walk to town for soap to wash the clothes her children were wearing, before she could bring them; and a third also found it necessary to make a trip to town on foot in order to purchase clothing for the occasion. Even then she had to borrow from a neighbor in order to have enough. Such are a few of the efforts which the mothers are known to have made in order that their children might have the benefit of the examination.

The examination was made in the presence of the mother or other person who accompanied the child to the car, and since each mother was told the special needs of her child as disclosed by the examination, it became of immediate personal value as well as serving the purpose of the study.

### THE PHYSICAL CONDITION OF THE CHILDREN.

One hundred and forty-nine children, 58 per cent of the total number between 2 and 11 years of age for whom information regarding home care was obtained, received physical examinations.<sup>5</sup> It is, therefore, only to these 149 children that the findings with reference to physical conditions relate.

### RESULTS OF WEIGHING AND MEASURING.

The children were weighed without clothes and the height was taken without shoes or stockings. In the absence of a standard of stripped weights with which to compare the weights of these children, a table derived from the Bowditch figures was used.<sup>6</sup> According to this scale, 20 per cent of the children were found to be 7 per cent or more underweight. A considerable number of this group were markedly below—from 15 to 23 per cent under the average.

### CLINICAL FINDINGS.

#### Number of Defects.

The total number of physical defects found in the children, without regard to the relative seriousness of the kinds of defects, is shown

<sup>5</sup> See p. 39.

<sup>6</sup> A table of average stripped weights was derived by subtracting Bowditch's figures of estimated weights of clothing from his averages including weights of clothing. Bowditch, H. P.: Eighth Annual Report of the State Board of Health of Massachusetts, 1877.

in Table I. Thus, abnormal tonsil conditions count as one defect, decayed teeth as another, any heart defect as a third, and so on. Only five of the children examined were found to be free from physical defect of any kind; the greater number had from 3 to 5 defects, but a number had 6 or 7, and a few even had from 8 to 10. The total number of defects found in the 149 children studied was 621, an average of more than 4 to each child. The younger children—those under 6—averaged 3.2 defects each; the children between 6 and 11 years of age averaged 4.6 defects. This difference may be partly explained by the greater prevalence of decayed teeth among the older children.

TABLE I.—*Number of physical defects, by age; children 2 to 11 years of age given physical examinations.*

| Number of defects. | Children given physical examinations. |                   |                    | Number of defects.       | Children given physical examinations. |                   |                    |
|--------------------|---------------------------------------|-------------------|--------------------|--------------------------|---------------------------------------|-------------------|--------------------|
|                    | Total.                                | 2-5 years of age. | 6-11 years of age. |                          | Total.                                | 2-5 years of age. | 6-11 years of age. |
| Total.....         | 149                                   | 45                | 104                | 5.....                   | 29                                    | 8                 | 21                 |
| None reported..... | 5                                     | 4                 | 1                  | 6.....                   | 10                                    | 1                 | 9                  |
| 1.....             | 13                                    | 9                 | 4                  | 7.....                   | 13                                    | 2                 | 11                 |
| 2.....             | 12                                    | 3                 | 9                  | 8.....                   | 6                                     | 1                 | 5                  |
| 3.....             | 20                                    | 7                 | 13                 | 9.....                   | 4                                     | 1                 | 3                  |
| 4.....             | 31                                    | 5                 | 26                 | 10.....                  | 2                                     | 1                 | 1                  |
|                    |                                       |                   |                    | Number not reported..... | 4                                     | 3                 | 1                  |

Total number of defects reported for all children, 621.

It was evident that many of these defects were due to lack of proper care, and that nearly all needed early attention if permanent injury to the children was to be avoided. Comment will be made regarding only a few defects the relation of which to nutrition is of special importance.

### Tonsils and Adenoids.

Seventy-four children, 50 per cent of the total number examined, were found to have enlarged or diseased tonsils. Symptoms indicative of adenoids were found in 27 per cent of the children.

### Teeth.

More than three-fourths of the children examined (78 per cent) were found to have carious teeth. Even in the preschool group over half the children, 25 of 45, had decayed temporary teeth; 91 of 104 children 6 to 11 years of age, inclusive, had decayed teeth either permanent or temporary, and nearly one-third of the children in this age group had one or more permanent teeth decayed.

That lack of care may have been a factor in producing this condition is indicated by the fact that 122 of the children (82 per cent) were reported by the examining physician to have dirty teeth, and 26 children (17 per cent), inflammation of the gums.



## Nutrition.

Weight in relation to height affords a rough indication of a child's general nutritive condition. It is customary, indeed, to class as undernourished all those who fall a certain per cent (usually 7 or 10 per cent) below the average weight for their height. In the present study it was desired in determining the nutrition to consider other criteria than weight alone, and also to show more gradations of nutrition than two—those corresponding to the undernourished and the well nourished. Five grades of nutrition were established—ex-

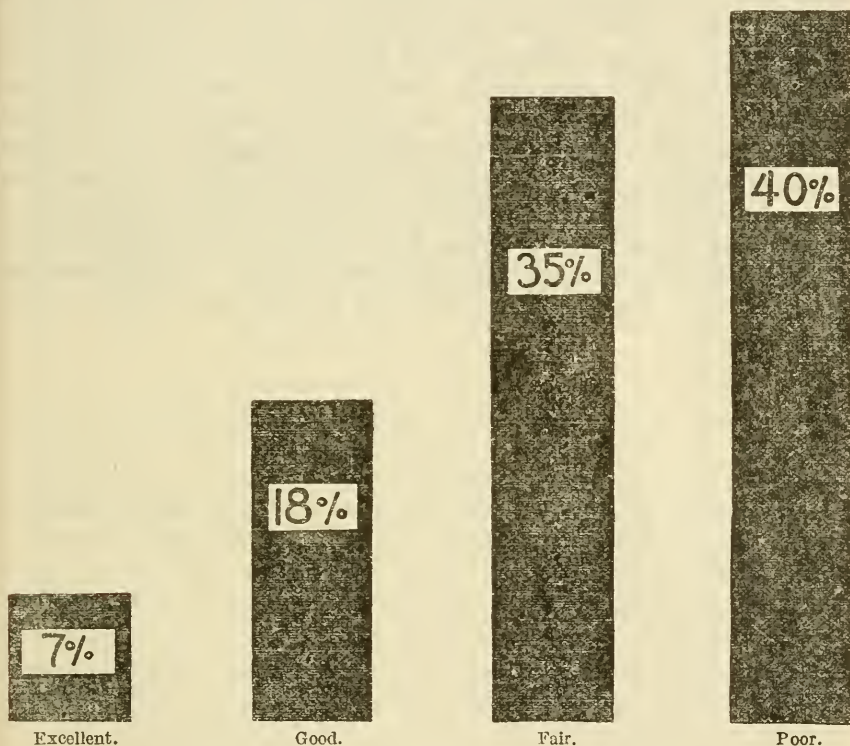


CHART I.—Per cent of children in each grade of nutrition.

cellent, good, fair, poor, and very poor—and the grade of each child was determined by the physician who made the physical examination. The weight was used as a guide, but it was not allowed absolutely to determine a child's grade of nutrition. As it happened, practically all the children 7 per cent underweight by the standard used were graded poor by the physician, but the converse was not always the case. A fat, flabby, anemic child was rated poor even though he measured well up to the average in weight, as was also a child who was unmistakably thin and undernourished. Every available factor, indeed, was taken into consideration in classifying the children.

It was found that only 10 children (7 per cent) could qualify as "excellent," and but 27 children (18 per cent) as "good." Two-thirds were classed either "fair" (35 per cent) or "poor" (34 per cent), and 9 children (6 per cent) were so much below par as to be rated "very poor." The significance of these figures becomes more apparent when it is borne in mind that with proper care and adequate and suitable diet maintained continuously from birth, every child should have been in the "excellent." or certainly in the "good," group. When only one-fourth of the children could be definitely graded as in excellent or good nutrition and when almost two-fifths (39 per cent) had to be classed as poorly or very poorly nourished, it is obvious that something was at fault in the care they had received. Either the food supply was lacking in amount or kind or the body was unable to use it. As previously shown, many defects were revealed by the physical examinations, including anemia, carious teeth, enlarged and diseased tonsils, and adenoids, and the prevalence of these defects undoubtedly accounted in part for the high percentage of poorly nourished children; but the diets and the general care the children received must also have been at fault. The information obtained from the interviews with the parents throws light upon these factors.

## HOME CONDITIONS DETERMINING THE CARE GIVEN THE CHILDREN.

### ECONOMIC STATUS OF THE FAMILY.

Most of the homes visited—103 of the 123—were the homes of small farmers; that is, the economic head of the household was working at least 3 acres of land, either owned or rented.<sup>8</sup> Where the land is extremely fertile and farming is intensive, 3 acres may furnish a good livelihood for a family; but, in sections like the one studied, where the soil is poor and the farms largely unimproved, a small farm can not possibly yield an adequate living. Forty-four of the 103 heads of families classed as farmers supplemented their income obtained from that source by earnings from some other occupation.

Information necessary to a fair judgment of the financial condition of each family was ascertained—regarding, for instance, in the case of those managing farms, the size of the farm, the acres cultivated, and the amount of stock; and in the case of those hired by the day or working at trades, their wages. On the basis of the information thus obtained the families were classed into three economic groups—A, B, and C—according to their ability to furnish the essentials of adequate living. In Group A are included the families whose ability to provide adequate food, shelter, and clothing could not be doubted; in Group B, those less certainly able so to provide for themselves; and in Group C, those who were unquestionably poor.

According to this classification 25 families containing 42 children between 2 and 11 years of age fell into Group A; 45 families with 95 children, into Group B; and 53 families with 119 children, into Group C. In other words nearly half the children (47 per cent) were living in homes in which the income was so small as to make even a minimum standard of care appear impossible, while but 16 per cent belonged to families clearly able to provide the modest requirements of adequate living.

Of the 25 families with the best economic status, 13 reported obtaining their living entirely from their farms, the average acreage of which was about 47; the others reported additional sources of income. Twenty-five of the 45 families in the B income group and 21 of the 53 in the C group reported that they were wholly dependent upon income from their farms.

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<sup>8</sup> This classification is in accord with that used by the U. S. Bureau of the Census. See Thirteenth Census of the United States, Vol. V, Agriculture, 1909 and 1910, pp. 22-24.

## HOUSING.

Housing bears an important relation to nutrition, since it affects directly the family's health and general welfare. On the whole the homes of the families studied seemed pitifully poor. Some were no more than board sheds with open cracks in the walls and floors, and no boards or banking at the base to keep out the wind; some, equally poor, were timeworn, one- or two-room log cabins with ample space between the logs and flooring and around the doors and windows to allow the air to enter freely; some were new shanties with one small window or perhaps with none at all. The old log houses, though often picturesque, were commonly far from desirable habitations. In many the chinking had fallen from the cracks, the floor was sagging, and the doors and windows were loose, so that at a dozen or more places the cold air had free access.

Only 3 of the 123 houses visited had a foundation; 37 were built on high, uninclosed piles, and 81 were placed either directly on the ground or on low piles or blocks with the space between the floor and the ground boarded up. Wide spaces were usually left between the boards. Only 27 houses had moderately close-fitting doors and windows. Broken window panes, unreplaced or stuffed with rags or covered with pasteboard, were common. Only 45 houses had at least one room that was plastered or ceiled. The kitchen was usually the coldest room in the house, being frequently little better than a shed. The mild climate made these conditions less serious than they would otherwise have been, but even so the majority of the children studied were living in houses that did not adequately afford protection from the weather.

A few modest but comfortable homes were found in the community. Several new log houses and some older ones that had been kept in good repair, together with a very small number of clapboarded, ceiled, or plastered frame houses, were adequate and comfortable dwellings.

In view of the poor construction of many of the houses, their heating was a problem. A fireplace with its open fire of logs added much to comfort and cheerfulness, but even a rousing fire on the hearth failed utterly to warm a house so open as were many of those visited. A small stove was not much more effectual. Of the 123 houses 63 were heated by fireplaces, 51 by stoves, and 7 had both a stove and a fireplace. The cooking in the homes was usually done on a kitchen stove, though many families also utilized the fireplace to some extent for cooking.

## SANITATION.

The method of disposal of human waste in the district studied was most insanitary. Considerably over half the families, 56 per





A NEW LOG HOUSE OF BETTER TYPE.

Note the base.



A TYPICAL CABIN.



cent, had no toilet of any kind, but used the barn, the chicken house, the yard, or the woods. Only one family had a water-flushed toilet; 51 had some kind of a yard privy. More than one of these privies, however, because of broken walls or missing doors failed to offer even privacy, and others were distinctly insanitary, because easily accessible to animals and flies. The general attitude seemed to be that a privy was nonessential.

### WATER SUPPLY.

More than half the families, 55 per cent, secured water from a spring, a stream—the “branch” it was usually termed—an open well, or some other unprotected source. The remainder obtained their supply from either a drilled well or a hydrant. Although undoubtedly the drilled well was a much safer source than the open well or the stream, the type used in this section appeared less safe than the term would imply. The well was not fitted with a tight cover nor the water drawn by a pump. Instead, the pipe, five or six inches in diameter, extended above the surface of the ground and was left open at the top. The water, which could be seen in the pipe a few feet below ground level, was drawn by means of a small bucket fitting into the pipe. The bucket hung by the well or sat on the ground when not in use. This, together with the fact that the pipe was uncovered, made contamination possible, though certainly less probable than in water secured from the other sources.

### AVAILABLE FOOD SUPPLY.

The chief concern of this survey was to secure all the information possible regarding the diet of the children. In order to do this in a rural area, it was necessary to investigate the source of supply, since the kind, amount, and variety of the children's food depend upon the food supply and food habits of the family. In addition, therefore, to learning the habits of the individual child with reference to diet, a detailed study was made of the foods which were grown or purchased for family use. Thus information was obtained concerning the production, preservation, and use of milk, butter, eggs, fruit, vegetables, cereals, breads, and meat—the chief foods in any dietary.

### Cereals and Bread.

Since corn was practically the only grain crop in the area, it was not surprising to find corn meal universally used for food. Most farmers took their corn to a local mill and had the whole <sup>until it</sup> ground into meal. This meal contained the bran layer and the <sup>rs, only</sup> <sub>st two or</sub> as well as the starchy endosperm—the part from which th

market product is made. Eighty-six families, representing 72 per cent of the children, used whole corn meal exclusively; 34 families purchased their meal at the store and so obtained only the bolted meal, while 3 families used some of both kinds. There can be no doubt of the distinct superiority of the whole meal over the bolted kind, especially if it is used as the main constituent of a rather restricted diet; most of the mineral matter of the grain as well as the vitamins which protect the body against the so-called deficiency diseases are contained in the bran and germ.

Wheat flour to some extent in all the homes supplemented corn meal. This flour was almost always the patent, highly milled variety, 118 families using only that made from bolted wheat. The remaining 5 families used some whole wheat or graham flour in addition. Oatmeal was used to a greater or less extent by 85 families.

Corn bread was the most common type of bread. Biscuits, however, occupied a place in the dietary second only to that of corn bread. Many families had biscuits for breakfast and corn bread for the other two meals, and frequently both were served at the same meal. A company meal, it seemed, demanded both, for apologies were offered when corn bread without biscuits was set before a guest. Yeast bread—or “light bread,” as it is usually called—occupied a very minor place in the dietaries of the families. In 85 homes, 69 per cent, corn bread and biscuits were used exclusively; only 37 families reported using any light bread. Some families who lived nearer town than the others bought light bread frequently, but in most homes it was purchased only on rare occasions. A single exception to the general practice was found in a home where the mother made light bread regularly and used corn bread and biscuits for occasional variation. The general relative use of these breads was strikingly shown by the local application of the term “bread,” which, it was soon discovered, always referred to corn bread.

This bread was usually made of corn meal, buttermilk, soda, and salt. Water was substituted for part of the milk if the milk supply was short. The bread was either baked in a sheet or fried in a skillet.

The biscuits observed in the school lunches and in the homes were usually large, underdone, and frequently yellow from excess of soda, and they were as a rule less palatable than the corn bread. They were most often made with soda and buttermilk, with water added if the amount of milk was insufficient.

### **Meat.**

Meat was commonly regarded as a necessity and eaten at every

It was the custom for a farmer to keep at least one hog to during the summer and kill in the fall. In general, it might



be said that the more prosperous the farmer the more hogs he killed. For example, 6 of the 9-families who killed five or more hogs belonged to the A income group, 2 to the B group, and 1 to the C group; while of the 27 families who killed but one hog, 12 were of the C group, 8 of the B group, and but 1 of the A group.

A little more than 80 per cent of the families killed at least a part of their own meat. Of these 101 families, 28 killed all they used, while 73 bought some meat to supplement their own. Twenty-one families purchased all their meat.

In the majority of families only salt meat was eaten, except during a short period immediately following butchering. The weather was not uniformly cold enough to make preservation by freezing practicable, and so the meat had to be preserved by means of salt. In addition to this, the meat which was purchased when the home supply gave out was usually salt.

In the section studied, hog killing was done in the late fall. The meat was usually salted on the day of the killing or very shortly afterwards. It was spoken of as fresh,<sup>9</sup> however, for some time after it had been laid down in salt. This study was made during "hog-killin'" time, and so the majority of the families were having "fresh hog meat" three times a day.

It may readily be seen that a family which depended entirely upon its own butchering had to eat salt meat most of the time. This meat was bound to be fat salt "middlings" (the side meat) for a considerable part of the year; the fresh meat—ribs, backbones, and sausage—was eaten first, then the hams and shoulders, and lastly the middlings. When the middlings gave out more was purchased.

Some families bought fresh meat in small amounts the year round, and most of them occasionally killed chickens, though these were much less commonly used than might be expected in a farming community.

In order, in the discussion of the diet, to distinguish between families living almost entirely on salt meat and those having appreciable amounts of fresh meat with some regularity, the families have been separated into two groups—those having a salt meat diet for as much as eight months of the year and those having fresh meat as often as weekly for more than four months, no matter whether the meat was beef, pork, chicken, or rabbit. It will be seen, therefore, that even the families classed as "fresh meat users" were not necessarily having any large amount of such meat. Yet only 24 per cent of the families could qualify for this group, while 60 per cent be-

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<sup>9</sup>The use of this term varied among the families. Some called meat fresh until it was hung up to dry, after it had been in salt two, three, or even six weeks; others, only while it had not yet absorbed enough salt to give it a salty taste, at the most two or three weeks after salting.

longed definitely in the "salt meat group." Sufficient data to classify the remainder were not obtained.

These facts are significant from the dietary standpoint. Although meat was served the year round three times a day, it consisted to such an extent of fat salt middlings that it made on the whole a questionable addition to the protein of the diet, the chief requisite that meat is supposed to supply. It is probable, moreover, that the vitamins which are present in fresh lean meat to a certain extent, and which are capable of protecting the body against certain nutritional disorders, were almost if not completely destroyed by the salting process. On the whole, therefore, the only food requirement which the meat supply in this section could be expected to contribute was that of energy.

### Vegetables.

Every family visited except two had a garden. The yield of vegetables, however, was very limited in variety and amount. The vegetables most commonly raised were beans, white potatoes, tomatoes, and onions; next to these came corn, cabbage, lettuce, peas, beets, sweet potatoes, and squash, or pumpkin; much less common were cucumbers, radishes, turnips, parsnips, and rhubarb. Carrots, cauliflower, asparagus, and celery were almost unknown; while greens, such as chard, collards, and spinach—with the exception of mustard, which six families reported raising for greens—were not grown at all.

The list of vegetables raised, while it shows restricted variety, makes the situation as regards vegetables appear much better than it really was; the amounts of all but a few of those raised were commonly found to be so small as to be almost negligible. In many cases the garden might have been disregarded because of the small contribution it made to the family's food. Sometimes it "burned out" so early in the summer that it furnished nothing at all. "Our ground's plumb wore out," commented one woman in explanation of their garden's failure. Even in homes where gardens did better, not more than a few vegetables were raised in any amount.

Of the 123 families, only 13 reported having any vegetables to sell. This does not necessarily signify that even these families had an abundant crop; more probably it indicates a need for ready money in the fall. To secure money at that season a few beans or potatoes were sold, though to do so might mean the buying of these same foods in late winter or spring at a higher price.

Comparatively few vegetables were stored for the winter. Eight families stored no vegetables at all; 28 families stored one or two; and 87 families a little more than two, but not many. More than four-fifths of the families canned some tomatoes; one-half of them stored white potatoes; somewhat more than three-fifths stored dry

beans; only one-third stored cabbages and onions, and fewer than this, beets or turnips.

Again it must be stated that this list, meager as it is for a farming community, makes the situation appear much better than the reality. One or two dozen cans of tomatoes might be all that a family had, or a bushel or two of potatoes and a few beans might be the winter supply. It was common to find that the few vegetables which had been stored were already used by the end of January. During the remainder of the winter the family must either buy more or go without. Except for beans, which the family usually purchased, if possible, when its own supply was exhausted, to go without was the general custom.

It is thus seen that beans were the principal winter vegetable. In some families they were practically the only vegetable for the greater part of the year. Some had beans every day—much as people in other sections have potatoes—and it was an exceptional family that did not cook them at least as often as twice a week. To use local terminology, only two kinds appeared to be used, “soup beans” and “shuck beans.” The former term is used to designate any kind of dry shelled beans—the navy bean, the red kidney, or any other variety. The navy bean is the one most raised, though specialists say that the red kidney bean would probably do much better. The “shuck” beans are the same beans dried with the shells on—string beans they are in reality—though the seeds are much larger than it is usual to let them become. The beans may be broken into pieces and dried, but more often they are strung on a thread and hung to dry in the kitchen. They are cooked with pork for a long time until both pod and seeds are tender.

### **Fruit.**

In spite of the claim of agricultural specialists that this section is well adapted to fruit culture, very little fruit is grown. Fully 80 per cent of the families visited were found to raise no fruit at all, while the remaining 25 families raised a small number of apples or peaches, or, in a few cases, both.

This scarcity of orchard fruit was somewhat alleviated by the fact that large quantities of blackberries grow wild in the mountains and may be had for the picking. As proof of their abundance may be cited the record of three women who were out but “four hours and picked 14 gallons.” Every family in the section was found to depend on wild blackberries to add fresh fruit to the diet. The blackberry season, however, lasts not more than a few weeks at the best, and so this fruit, which was the only one available in a large percentage of the homes, could influence the diet for but a short period unless it was canned. Practically every family (95 per cent), however,



canned or preserved some blackberries for the winter, though in many cases the amount put up was known to be very small.

The extent to which these families depended on blackberries for fruit is further shown by the fact that no other fruit was canned by nearly two-thirds of them (63 per cent). Somewhat less than a third (32 per cent) put up a few apples or peaches in addition, while six families canned or preserved no fruit at all, not even blackberries.

It may readily be seen that fruit, either fresh or preserved, was far from being a daily article of diet. Indeed it appears certain that a considerable number of families must have been without fruit of any kind for more than half the year—from the time the few canned blackberries gave out (in October, November, or December) until the next blackberry season the following summer.

### Eggs.

In spite of the fact that 85 per cent of the families kept chickens, eggs were comparatively little used throughout the section. This was accounted for, in part, by the small production. The number of hens kept by a family was ordinarily not large, and the yield of eggs was unusually small. At the time this study was made, in late fall and early winter, 105 families were keeping a total of 3,604 hens, and the total daily yield of eggs was 215. The yield was not high, moreover, even in the most productive season of the year.

The explanation of the poor yield lay in the lack of care which was given the hens. Very poor shelter or none at all, even during the winter, was the usual lot of a flock, and their food was quite on a par with their housing. They ran wild the year round, and received practically no food but corn.

The few eggs produced were usually sold. "We can't eat eggs when every egg is worth 5 cents!" exclaimed one woman, voicing thereby the common sentiment. The daily consumption of eggs at the time of this study averaged less than one per family.

### Sorghum.

In the community studied farmers customarily either raised enough sorghum for their own use or purchased it from their neighbors. Butter and "lasses," as the sorghum was locally called, was a favorite combination. The butter was stirred into the sorghum and the mixture eaten with biscuit. Children sometimes carried glasses of it in their school lunches. Sorghum appeared to be used somewhat less widely than usual during the year this study was made, due probably, at least in part, to its higher price. Many families were using a commercial corn sirup instead.



### Milk and Butter.

Milk, throughout the area studied, was regarded as a necessity, and keeping a cow, if it could be afforded, was taken as a matter of course. Eighty per cent of the families had one or more cows at the time of the study. Of the 24 families without them, 9 were purchasing a regular and apparently adequate amount of milk, 4 were buying an irregular or an inadequate supply, while 11 families had very little or none.

Fifty-seven of the 99 families keeping one or more cows had no period when they were without milk of their own. Of these families those with more than one cow planned to have them go dry at different times, while the others traded the cow about to go dry for a fresh one.<sup>10</sup> Thirty-four families, when the cow was dry, either bought milk or received it as a gift from neighbors. The milk secured was usually buttermilk and varied in amount and regularity. Eight families went without milk when their own cows furnished none.

Only one family in the whole district used condensed milk, and milk powder was unknown. To summarize, 100 families, or 81 per cent, were having a fairly steady milk supply, while 19 per cent either had no milk at all or were without it for considerable periods.

In many places milk figures little in the diet of children and perhaps not at all in the diet of adults. In this community, on the contrary, it was regarded as a staple article of diet and whenever obtainable, was drunk regularly by children and adults alike. When it was plentiful great pitchers of it were put on the table at every meal. "Milk," said one mother, "is what I've raised my family on. My family here uses buttermilk like it was water." A number of families testified to using milk "for water:" and many a strong man was pointed out proudly as having been reared on milk and corn bread.

Milk was alike the best feature of the better diets and the salvation of many of the poorer ones. Indeed, as later will be more fully apparent, it was the one redeeming feature of the whole food situation.

Seventy-one per cent of the families visited were accustomed to making all their own butter. Of the remainder, 13 families bought all they used, 4 supplemented their home supply by purchase, and 18 (15 per cent) used no butter. The amount that was made was frequently inadequate and the making of butter was necessarily discontinued in many homes during the period of decreasing milk supply as well as during the time when the cow was dry. At such times the families who depended entirely on their home supply of butter

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<sup>10</sup> There were traders in this section who made a regular business of buying up dry cows and selling them at a higher price when they became fresh.

substituted drippings. Some families, to be sure, that had more than one cow could manage so that their own supply never failed. It is certain that a far larger number than the 15 per cent who did not use butter at all must have had a very limited supply or lacked this food entirely during an appreciable part of the year.

Absence of butter from the diet is of small consequence, providing plenty of whole milk is used, as it customarily was in the homes of this section whenever available. But, unfortunately, when the milk supply diminished or failed entirely and the family could no longer make butter, it was skim milk or buttermilk rather than whole milk which was usually secured. Thus the families who were most in need of butter, those using skim milk, were the ones without it, while the families having plenty of whole milk were also those who had butter.

### **Adequacy of food supply.**

It has been seen that the diet of families in this section was much restricted. Vegetables and fruits, which are usually relied upon to lend variety and flavor to the diet, were little used, while even potatoes, a staple food, did not figure very largely in the dietary. Fresh meat, eggs, and butter, all of which add much in the way of flavor and general palatability as well as food value, had but limited use. The diet may indeed be described as one of corn bread, milk, and fat salt meat, while in some diets milk was lacking or limited in amount during at least a part of the year. Adding to this list beans, sorghum, and biscuits, with butter when the cow was fresh, and blackberries and a few vegetables for a short season, there results the usual diet at its best. Only a limited number of families fared better than this, their supply of milk and butter being more plentiful, fresh meat bought fairly frequently, and vegetables and fruit used more extensively.

So restricted a diet is unquestionably monotonous. A hopelessly monotonous diet, however, may be a perfectly adequate one if it is capable of supplying all the body's needs. The diet of corn bread and milk on which a considerable number of mothers stated they had reared their families is probably capable of barely meeting all the needs of the body, provided that the milk is whole and is taken in liberal amounts, and provided that the corn meal is made from the whole grain. Both of these conditions were often met in the diets studied in this district.

To suggest the advisability of living on a diet of these two foods is not for a moment, of course, intended. It can not be doubted that the addition of fruits and vegetables would render such a diet more surely safe as well as distinctly more palatable. Nevertheless the fact remains that it would be difficult to find two other foods which together would be better able to provide an adequate diet. Any

other whole cereal, or potatoes, might take the place of the corn meal, but if the milk is dropped out, decreased in amount, or changed to skim milk or buttermilk, as was all too frequently done in this section, the effect is disastrous.

The corn-bread and fat-meat diet which was the common one when milk was omitted is deficient in calcium, adequate protein, and vitamine content. Add any one or more of the foods used in the community—beans, biscuits, sorghum, potatoes, sweet potatoes, or fresh meat—and though the diet is bettered it still remains inadequate in some respect, notably in calcium and in the fat-soluble vitamine. Restore milk and all the deficiencies are covered. Small wonder, then, that milk is called a “protective” food. It is veritably the salvation of the diets of this community.

## THE DIET OF THE CHILDREN.

In the discussion of the family food supply, the possibilities for the children's diet in the families studied have to no small extent been indicated. Diet is of such importance in relation to nutrition, however, that an effort was made to secure more detailed information concerning the feeding of the children between 2 and 11 years of age. The actual diet of a child on the day preceding the interview was learned,<sup>11</sup> and to supplement this information his food habits were ascertained—the amount of milk he drank; the frequency with which he ate fruits, vegetables, meat, and eggs; his likes and dislikes for important foods; his custom with reference to eating between meals; his indulgence in candy and other sweets; and his use of coffee and tea. As a result a fairly clear picture of the child's dietary was obtained, and what is believed to be a tolerably safe judgment regarding its adequacy was in most cases possible.

The feeding of the children during the period of infancy will first be discussed, after which consideration will be given to the use of the different classes of food and the adequacy of the diets as a whole.

### INFANT FEEDING.

No study of the factors responsible for a child's nutritive condition would be complete without some inquiry as to his care and feeding during infancy. In this survey a detailed study was impossible, but a few important questions were included in the schedule. Information was secured as to whether or not a child was breast fed, the age at which he was weaned, and the time at which he was given solid food.

#### Breast feeding.

Practically all the children in the survey had the very distinct advantage of having been breast fed; 221, or 86 per cent, were reported to have been nursed for 6 months or longer, 4 less than this time, and only 9 had never been breast fed. For 22 children, no reply as to infant feeding was obtained. It was indeed fortunate that so many had had the benefit of breast feeding, for a breast-fed child has not only a better chance of living beyond infancy but can withstand much more in the way of unwise care and feeding than can an artificially fed child.

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<sup>11</sup> If the diet on the day preceding varied from the ordinary one, a more typical day's diet was ascertained instead.



**Age of weaning and age at which solid food was given.**

Not only was breast feeding common but prolonged nursing was not at all unusual. Of the 221 children who were nursed for six months or longer only 22—10 per cent—were weaned before they were a year old. About half were weaned when they were between 1 year and 18 months of age and 44 per cent were nursed for 18 months or longer. Indeed, more than a fourth were not weaned until the age of 24 months or even later.

The prevalence of this custom of late weaning would be of greater significance had the children received no other food than breast milk before weaning. It was a common practice, however, to give tastes of food to very young babies. Thirty-four children (13 per cent) were given solid food before they were 1 month old, and fully two-thirds of the children were receiving it when they reached the age of 6 months. By solid food is meant food from the family table. The common belief and practice in respect to early feeding was probably summed up by the mother who stated that at about one month she began giving her babies "mighty nigh anything" that was soft, and at 5 months the whole family diet, because "a great big baby 5 months old can eat anything."

The feeding of babies, as the foregoing discussion indicates, was rarely according to plan, but followed rather the line of least resistance. A baby was nursed because it was the custom; he was taken to the table in his mother's arms and given tastes of whatever the mother ate; he was nursed whenever he cried; and he weaned himself when he grew big enough to prefer other food to breast milk or when another baby had usurped his place.

**MILK.**

Where the family food supply is as limited as in the locality studied the rôle which is played by milk becomes a doubly important one. Especial effort was therefore made to gather information regarding its use by the children. The amount of the family supply, taken in connection with the number in the family, afforded some indication of the amount available for each child, but further effort was made to learn how much each child consumed. The daily amount was usually reported by the mother as so many "cups." Since a "cup" might hold from a fourth to a half of a pint, the agent asked to see the cup which the child used and then approximated the amount. Inquiry was also made regarding frequently used foods containing milk, such as corn bread and milk gravy. From the amount consumed by the entire family, the number in the family, the amount which was taken as a beverage by the child, and the amount consumed in other food, a conservative estimate of the total amount of milk consumed by the child was made.

On the basis described above, it was judged that nearly three-fourths of the children, 72 per cent, consumed at least a pint of milk daily, the amount commonly regarded as the minimum for children of the ages covered by the study. The majority in this group, 57 per cent, had daily as much as one and one-half pints, a quart, or even more. Eighteen children were receiving well over a quart of milk a day, some of them nearly 2 quarts.

Not all were so fortunate, however; 63, or 25 per cent, of the children fell below the standard of a pint a day, and 24 of these, or 9 per cent of the total, had no milk at all—a serious situation for any children but doubly so for those in this section where the diet was so restricted in other respects.

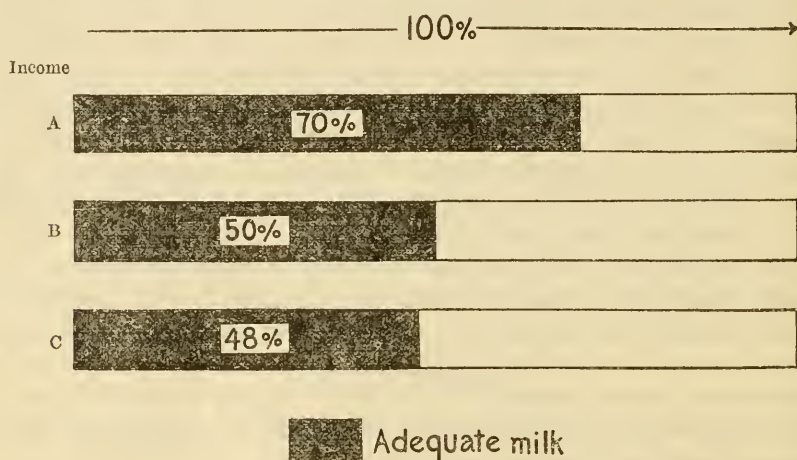


CHART II.—Adequate use of milk in relation to income.

The failure of these children to have sufficient milk was evidently not to any large extent the result of dislike for it, since only 16 children, or 6 per cent, were said not to care for milk, while a fourth of the children were getting less than the minimum amount. That milk was so generally liked by the children was probably due, in part, to the monotonous diet common in the community, and to the absence of highly flavored foods which tempt the appetite and make a bland, mild-flavored food like milk unpalatable. The fact that milk drinking by old and young was a community custom undoubtedly helped also.

Chart II shows how the proportion of children whose milk supply was adequate varied in the different income groups. Seventy per cent of the children in families with A incomes—the highest income group—had an adequate supply, and only about 50 per cent in the B or C groups.

A child's physical condition, however, depends not only on his present use of milk but on what he has had throughout his life. An effort was made, therefore, to secure for each child as complete a milk history as possible. In the belief that sufficient data were thus obtained to warrant forming a judgment as to whether or not a child had an adequate milk supply for practically all his life, the children have been classified as follows:

Class A: Those who undoubtedly had always had an adequate supply of milk.

Class B: Those who had experienced periods of ample and of scant supply, or children the adequacy of whose milk supply was doubtful.

Class C: Those who undoubtedly had not had an adequate supply.

More than half the children, 52 per cent, were considered as belonging in class A; nearly a third, or 31 per cent, were placed in class B; and about one-eighth, or 17 per cent, in class C.

#### EGGS.

Since eggs were not plentiful in this community they could not figure very largely in the diet of the children. Even during the period of maximum yield only 159 children, 62 per cent, had eggs twice a week or oftener—with sufficient frequency, that is, to influence their diet to any extent. Of the remainder, 24 were given an egg about once a week, 7 about once in two weeks—or even less frequently—and 64, or 25 per cent, had no eggs at all.

In the winter eggs were practically never eaten; 208 children, or 81 per cent, did not have any during that period; 7 had them as rarely as once in two weeks; only 17, about weekly; and only 23, or 9 per cent, twice a week or oftener.

Occasionally a mother said her child did not eat eggs because he disliked them, or because they disagreed with him. But usually the reason for the infrequency of eggs in the diet seemed to be that they were regarded as money.

#### VEGETABLES.

Vegetables other than beans did not figure largely in the family food supply and hence played but small part in the diet of the children. During the very short time the gardens produced, nearly all the children had access to fresh vegetables and ate them almost daily, but throughout the remainder of the year there was little opportunity for any variety. True, during the winter two-fifths of the children, 41 per cent, were reported to have some kind of vegetable as

often as five or six times a week; a somewhat larger number, 47 per cent, as often as two, three or four times a week; and only 27 children, or 10 per cent, ate no vegetables at all. But if it is recalled how few vegetables were raised, how short the garden period was, what limited amounts were canned or stored, and how restricted the purchase of them was, practically the only vegetable purchased being beans, it is clear that beans were often of necessity the only vegetable the children had during the winter and until the next garden season.

Children apparently failed to eat vegetables not because of distaste for them but rather because of the meagerness of the supply; 214 children, 84 per cent, were reported as eating and liking all the kinds they had had opportunity to try, and more than half the remainder, 22, were said to like all but one. It would appear that, on the whole, they ate willingly whatever was offered them.

### FRUIT.

Plenty of fruit is commonly regarded as essential in the diet of children and fruit of some kind at least once a day is practically always considered a minimum requirement. Only 35 children included in this study, 14 per cent, customarily had fruit every day; 80 children, 31 per cent, had it several times a week; and more than half, 55 per cent, had little or none.

Fifty-four per cent of the children almost never had any other fruit than wild blackberries. The remainder occasionally had in addition an orange or a few canned or dried apples. A very limited number of those having fruit every day were known to be receiving a moderate variety.

### MEAT.

Although meat was usually served three times a day in the community studied, the children did not necessarily eat it at every meal. The figures show that 94 children, or 37 per cent, were eating meat two or three times a day; 102, or 40 per cent, were eating it once a day; while 58 children, 23 per cent, ate it less frequently than daily and six of these ate no meat.

Although these figures seem to show that the children's meat consumption was rather high and that, therefore, they were securing a liberal supply of protein, this was not the case. During "hog-killin' time," to be sure—the period during which the study was made—many children were having fresh meat with a fair proportion of lean in it three times a day. One could tell which families had butchered by observing which children had fresh hog meat in their dinner pails at school. This period lasted but a short time. Considerably more than half the children were known to belong to families in which the meat supply was practically all salt middlings



and in the families of most of the remainder fresh lean meat was by no means common. If, as was true in many cases, the children had no other lean than the "little lean streak" in the middlings they could not be regarded as securing much protein even though they ate a "streak" or two of lean at each meal. Meat therefore made on the whole but a negligible contribution to the protein of the children's diets. With eggs little used, it may be seen that milk was the only food which could be relied upon to supply the needed animal protein.

#### BREAD AND CEREALS.

Biscuits made of bolted white flour and corn bread made in the majority of cases out of whole corn meal were the only bread eaten by 70 per cent of the children (179). The remainder had some yeast bread in addition, though usually as a rare treat rather than as a customary part of the diet. Only one child included in the study had light bread most of the time.

#### CANDY.

The candy habit, though not so extreme as among city children, was still a problem with which to reckon. Only 47, or 18 per cent, of the children had no candy at all or had it very infrequently; 17 had it almost daily; 80 (31 per cent) several times a week; and 111 (43 per cent), about once a week. More important than the frequency of eating, however, is the time at which candy is eaten. At the close of a meal a piece or two is probably harmless for children past early childhood, but eaten between meals it certainly can not be so regarded. The candy eaten by the children studied was almost invariably eaten between meals, for only five were said to have it at the end of meals.

The younger the child, the greater the harm which may be done by injudicious eating of unsuitable foods. The candy habit, like the coffee habit, is often started very early in life. Nearly half the children here considered (42 per cent) began eating it before they were six months' old, and all but 32 of the remainder who had candy at all were given it by the time they were 1 year of age. One mother said that long before they could sit alone her children had candy, while another knew that one of her children was given his first candy when only a few days old, for, as she explained, "it was while I was still a layin' in the bed, for I remember callin', 'Maw, do come and see Andrew Jackson eat this stick of candy!'"

The amount of candy consumed and the frequency of eating it probably depended more upon accessibility to a source of supply and financial ability to purchase it than upon any convictions the parents had as to its harmful effects. Thirty-four of the forty-seven children

who had little or no candy belonged to families in the C income group. Six children, however, were refused it because their parents felt it was not good for them. The fathers of these children brought from town fruit instead of candy for their treat. Of the 17 children who had candy almost daily 7 passed a store on their way to school; the parents of 2 others were in town every day; and 5 were "only children" and were humored by their parents.

Over two-fifths of the children, as has been noted, had candy about once a week. The father usually went to town on Saturday, and, apparently, did not feel that he had done his duty unless he brought home candy for the children. When the family was large and the income small, the amount each child received was not sufficient to do much harm, though eaten, as it was, between meals; but sometimes the amount was greater and a child was allowed to eat all he wanted, to the extent of interfering with his appetite for wholesome food. "He refuses his grub," observed the mother of a 2-year-old boy, whose father, to use the mother's words, "is a sight to buy candy."

Although undoubtedly some of the children were eating too much candy for their good, the majority probably did not receive enough to do them much harm. It is probable, however, that candy would have been as great a menace to the children's health in the locality studied as it is in any other if stores had been nearer at hand, and the money more easily spared.

#### COFFEE AND TEA.

No attempt has been made in this study to distinguish between coffee and tea, as their effect on children is about the same. In the following discussion, therefore, the use of the term "coffee" should be interpreted to mean either coffee or tea. As a matter of fact, it was coffee rather than tea which was generally used.

Coffee drinking was common among the children, though not to the extent that it frequently is among children in other localities. Of the children studied 45 per cent drank neither coffee nor tea. Four of these had previously done so, but had discontinued the habit, one because his mother thought it "made him nervous" and two of the others—in one family—because their mother, who had first given them tastes at about 6 months of age, decided that coffee was affecting one child's kidneys, and so stopped giving it to both. A few mothers were found who had never allowed their children coffee, because they believed it was not good for them, but usually when children did not drink coffee it was because they did not want it.

There were 142 children (55 per cent) who drank coffee, 64 irregularly, but 78, or 30 per cent, at least once a day. This is more significant in view of the fact that the coffee which the children drank

was not as a rule diluted with water or a large amount of milk. Of the children who used coffee at all 85 per cent drank it as strong as the adults in their families, and only 13 per cent had it diluted to any extent.

A second consideration which increased the probability of harm was the early age at which coffee drinking started. Of the 124 children whose age at beginning to drink coffee was ascertained all but 9 had started before they were 6 years of age. Sixteen had been given coffee before they were 6 months old and 50 more by the end of their first year. An early start seems to establish the habit; of the children who began at 1 year of age or younger 46, or 70 per cent, were having it daily or oftener. One small boy revealed that coffee had already become a necessity to him by his statement that it "hurt him in the head" if he did not have it.

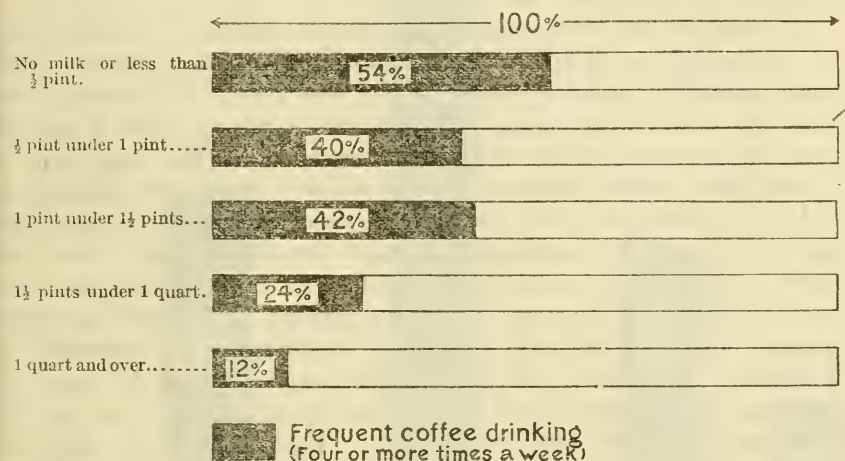


CHART III.—Coffee drinking in relation to the use of milk.

The custom is often begun when the mother takes the baby to the table in her arms and gives him tastes from her cup, just as she gives him tastes of potatoes and other foods. The custom of allowing small children to drink coffee is also in accord with the belief that they are competent to choose their own foods and to eat anything which the rest of the family have.

The consumption of coffee was apparently greater when the use of milk was small. Half the children who drank no milk drank coffee four times a week or oftener, while only 29 per cent of those who drank a pint or more of milk a day drank coffee to this extent. "If he has milk, he doesn't care for coffee," was a comment not infrequently made by mothers. One mother explained that her child drank coffee only when the family were using buttermilk, which the child disliked. Increasing the milk supply in this locality would probably decrease the use of coffee by the children.



## EATING BETWEEN MEALS.

Among the children in the district eating between meals was not so serious a problem as it usually is among city children. Nevertheless, the habit of "piecing" was indulged in to a greater extent than can be considered wise. Only 10 of the children were said not to eat between meals, while 142 habitually did so at least once a day. The seriousness of the habit, however, depends not only upon its frequency but also upon the kind of things which are eaten. Simple foods, like bread and butter, milk, and fruit, eaten as an extra meal after school or as a midmorning lunch, are commonly regarded as harmless and sometimes even as advisable; but promiscuous indulgence in candy or other sweets or haphazard eating of any food, however harmless in itself, is fairly sure to interfere with a child's appetite for his regular meals.

At least 109 children—43 per cent—either because of the frequency of eating between meals or the character of the food eaten or both were probably harming themselves by this habit. "He eats every time he comes in the house," "he carries a piece of bread around most of the time," "he snacks so much he don't get hungry," are typical descriptions by the mothers of this sort of promiscuous eating.

Little parental authority, apparently, was exercised to control this habit. A very few mothers expressed the belief that it was not good for children to eat between meals, but the more common attitude was to allow them to do as they pleased. "It stunts a child's growth not to get the food he wants," was the opinion expressed by a mother; while one of the fathers was convinced that the best way to bring up children was to "give them all they want to eat and let them eat every time they get hungry." These statements, undoubtedly, sum up the current belief and practice in the locality.

## ADEQUACY OF THE DIETS.

Owing to the method employed in this study only a very rough estimate of the quantity of food eaten was obtainable, and it was not possible to secure much definite information concerning the factors which determine the digestibility and assimilation of this food. Hence, in formulating judgments concerning the adequacy of the diets these two factors have been disregarded and the judgment in each case has been based upon whether or not the diet, assuming that enough was eaten and the body was able to utilize it, probably contained the constituents necessary to nourish the child. It is evident that a judgment thus arrived at does more than justice to the diets, for it is known that an insufficient amount of food and inability to utilize food eaten are two important causes of malnutrition in children; and even with these factors eliminated the evi-

dence still remains that the majority of the children studied were living on diets which were very far from meeting their requirements for growth.

In order to facilitate discussion and make possible the relation of diet to other conditions, the children have been placed in three groups according to the adequacy of their diets. Class A comprises all children whose diets it seemed fairly certain included the constituents required to nourish the growing body: class C includes

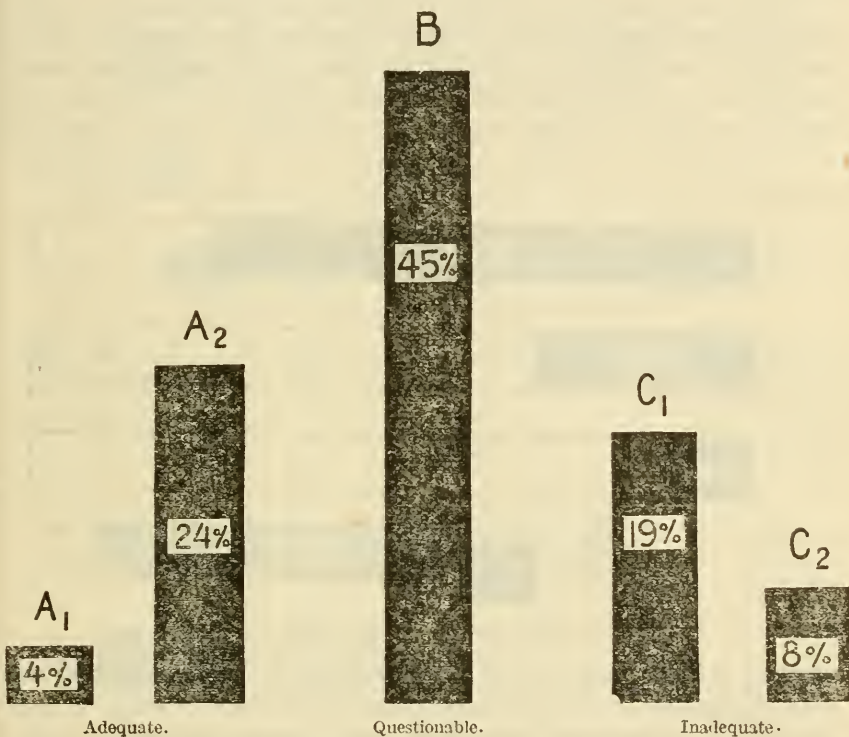


CHART IV.—Per cent of children in each grade of diet.

children whose diets just as certainly failed to meet these needs; and class B includes the children whose diets could not clearly be assigned to class A or class C. Classes A and C have been further subdivided into A<sub>1</sub> and A<sub>2</sub>, C<sub>1</sub> and C<sub>2</sub>, to show gradations of adequacy and inadequacy. The distinction between A<sub>1</sub> and A<sub>2</sub> diets is merely that the latter consist very largely, if not exclusively, of milk and corn bread made of whole meal, and so are very monotonous; while the former contain in addition fruit, vegetables, and in general a better variety. In the same way C<sub>1</sub> diets, though plainly inadequate, may have some redeeming feature, while those designated as C<sub>2</sub> are practically "deficiency diets."



According to this classification, 28 per cent, or more than a fourth of the children, had class A diets; 10 of these could be ranked as A<sub>1</sub>, while 62 were on diets of A<sub>2</sub> grade. Nearly the same proportion of the children—27 per cent—were found to be receiving class C diets, 48 of them being considered C<sub>1</sub>, while the diets of 20 were so exceedingly poor that they were classified as C<sub>2</sub>. The remainder of the children—45 per cent—were in the group having class B diets.

These figures reveal a situation which is undeniably grave. When nearly three-fourths of the children between the ages of 2 and 11 years in a community are living on diets which are either plainly inadequate or of very doubtful adequacy, it is time to inquire into the cause. That poverty was to a considerable extent responsible

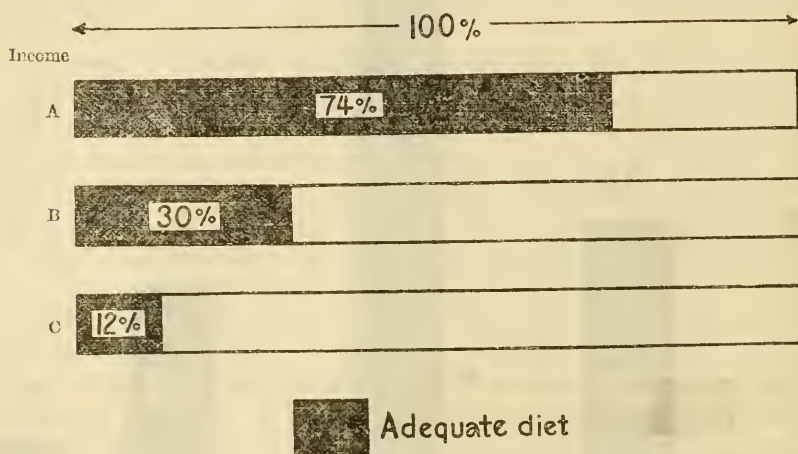


CHART V.—Adequacy of diet in relation to income.

appears evident from Chart V. Seventy-four per cent of the children of families in the A income group, 30 per cent of those in families with B incomes, and but 12 per cent of those in families with C incomes were receiving diets judged as adequate (class A). That ignorance and lack of control were also responsible can not be doubted. Little knowledge existed of children's food needs and little or no control was exercised over their diets. Even though poverty might be relieved, and improvement in the dietary follow, there would still remain the need of education in the food requirements of children.

Milk, as has already been stated, was the salvation of the diets in this section. Of the children having less than a pint of milk a day practically all had an unquestionably inadequate diet. No child having less than a pint of milk daily had a class A diet, and even of those securing this amount only half could be so classified. This indicates what was actually the fact, that the diets on the whole

were so lacking in all other important foods that their only chance of attaining adequacy was the inclusion of a liberal amount of milk. With no dependable supply of vegetables, fruit, eggs, butter, or lean

←————— 100% —————→

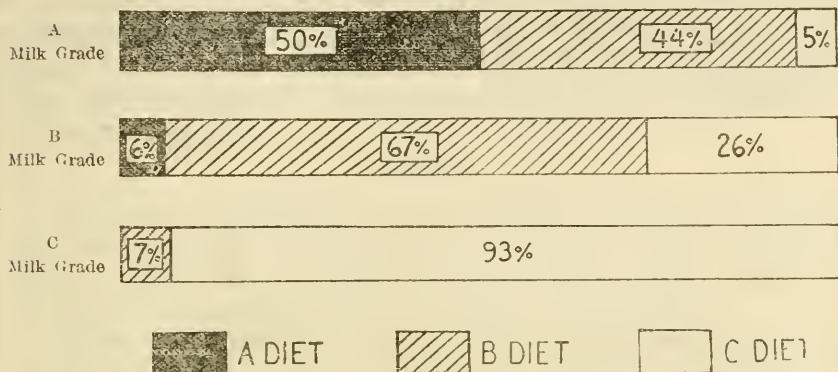


CHART VI.—Grade of diet in relation to use of milk.

meat, the sole food which could be counted on to any extent to furnish vitamins, minerals—particularly calcium—and adequate protein, was milk.

←————— 100% —————→

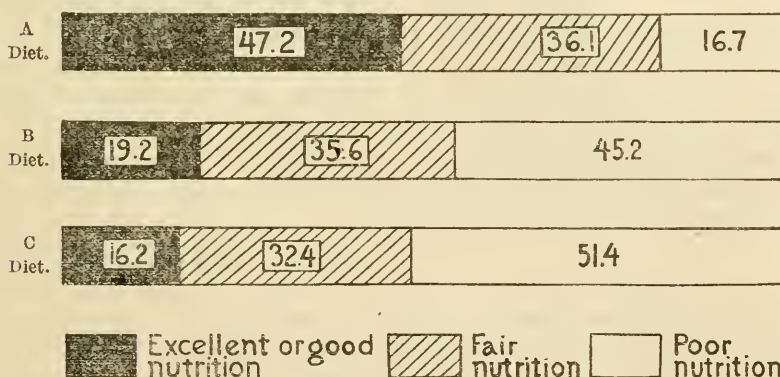


CHART VII.—Grade of nutrition in relation to grade of diet.

### RELATION OF DIET TO NUTRITION.

The nutrition of the children, as determined by the medical examination, has already been discussed,<sup>12</sup> and the children have been classified into five groups—those with excellent, good, fair, poor, and very poor nutrition. It is of interest to compare the distribution

<sup>12</sup> See p. 7.

of the children according to the adequacy of their diets with their classification by grades of nutrition. Chart 7 shows that nearly one-half (47.2 per cent) of the children with the best type of diet were classed by the physician as having either excellent or good nutrition and that this proportion falls to about one-sixth (16.2 per cent) for those in the poorest diet groups. Likewise, over one-half (51.4 per cent) of the children in the latter group were in poor nutrition as compared with only one-sixth of those (16.7 per cent) in the best diet group.

## OTHER ITEMS OF CARE AFFECTING THE CHILD'S NUTRITION AND GENERAL WELFARE.

Although the chief emphasis in the survey was placed on the food problem, other factors of hygiene known to affect the nutrition and general well-being of children were likewise studied. These included sleep, fresh air, habits of cleanliness, adequacy of clothing, and conditions of schooling.

### SLEEP.

Aside from diet there is probably no factor which has a greater influence than sleep on the physical well-being of a child. The bedtime and rising time, the number of hours of sleep, and the conditions under which the children slept were therefore ascertained.

Bedtime was found to be, on the whole, commendably early, but because of the early hour of rising the total sleep in the majority of cases was less than the needed amount. Almost two-thirds of the 100 children under 6 years of age were in bed by 7 o'clock—the latest hour usually advised for children of this age—while all but 7 of the remaining third were in bed by 8 o'clock. Unfortunately, however, the time of rising was correspondingly early, since nearly two-thirds of this group were up by 5 o'clock, and 23 of them by 4 o'clock. Only 4 of the children under 6 got up later than 6 o'clock.

It is impossible to state the exact number of hours of sleep which are needed by children of these ages: no doubt the amount varies with different children and with the quality of the sleep. Various authorities advocate different amounts—some, 12 or 13 hours; others, a minimum of 11. The majority of the children under 6 years of age included in the study were found to fall below any of these standards; 65 of the 100 were having less than 11 hours sleep, and 38 were having even less than 10 hours.

The condition was much the same among the children 6 to 11 years of age. The bedtime, as with the younger children, was early, for nearly 90 per cent of them were in bed by 8 o'clock and half by 7 o'clock; but again the early rising hour cut short the amount of sleep. Only 7 of the 156 children in this group got up later than 6 o'clock in the morning, while almost seven-tenths were up by 5 and 29 arose as early as 4. The number of sleeping hours, therefore, in spite of the early bedtime, was less than it should have been. Almost half the children in this group fell below a 10-hour minimum, the least amount estimated as sufficient for children 6 to 11 years of age.



A popular impression exists that sufficient sleep is not a problem for children in rural communities because of the habit of early retiring. This study shows that the "early-to-bed" habit was by no means a sure indication that a child was getting sufficient sleep. In spite of the fact that the large majority of the children in the district studied were going to bed early, more than half—55 per cent—were securing less sleep than the amount required, according to the lowest standards for their respective ages.

It is difficult to understand why little children should be required to get up so early. The explanation seems to be that all the members of the family—adults, children, and babies—follow the same hours, both for retiring and rising. A 7-o'clock bedtime for an adult means that by 3 or 4 o'clock in the morning he is ready to get up. The children may be required to conform to the hours of their elders, or if the whole family sleeps in the same room the children are disturbed when their parents rise, so get up with them.

It is probable that one mother gave the explanation for others as well as herself when she said of her 4-year-old child: "Sometimes he gets up at 3 o'clock when I do; but if he isn't up by 4 o'clock, I wake him, because I want to learn him to be smart." There seemed to be a general belief that a child who was not up to eat breakfast with the family, no matter how young the child nor how early the breakfast hour, would never amount to anything.

A separate bed in a separate room is usually considered the ideal sleeping arrangement for a child. Few of the children in this study were thus provided for. Only 18 of the 256 included slept alone; 106 slept two in a bed; while more than half (132) slept three or four in one bed. Rooms were crowded as well as beds. Only 4 children slept in rooms by themselves, while half (128) shared rooms with four or more other persons. Thirty-six children were sharing rooms with 5 others, 15 with 6, 26 with 7, and 4 with 8.

This does not necessarily indicate crowding as determined by the number of cubic feet of air per person. The room was often large enough to accommodate two or three beds and yet give ample space to be used as a sitting room; not infrequently, however, it was small and distinctly crowded. But disregarding the size of the room altogether, it can not be doubted that the sleeping conditions of many children were not conducive to either their physical or their moral well-being. A child sleeping one of four in a bed, in a room with as many as eight occupants, can scarcely have peaceful, undisturbed rest. Moreover, six, seven, eight, or nine persons—adults, small children, grown boys and girls—can not be thus herded in one sleeping room without endangering moral standards.

In the winter season, when this study was made, 205, or 80 per cent, of the children either removed only a few outer garments at night



or slept in all their clothes except their shoes. Only 51 children, or 20 per cent, had some sort of night garment, and but 17 of these customarily removed all their day clothing. Not more than about 7 per cent of all the children, therefore, were sleeping in a suitable night garment with all day clothing removed.

The cold houses, the lack of privacy, and bedding frequently inadequate accounted for this at least in part. "Yes," answered one mother when this question was put to her, "the children sleep in all their clothes. If they didn't they would freeze to death." Not all the failures to attain the standard in this particular can be accounted for on these grounds, however. It was evident that provision of suitable sleeping garments did not enter into the ordinary standard of living of the locality.

#### FRESH AIR.

Fresh air in abundance day and night is requisite to the proper care of children. In the district studied it was the requirement most commonly fulfilled, but from compulsion and not from choice. It is probable that most of the children would not have had any fresh air at night if it had not been for poor housing, for 93 per cent of them were sleeping in winter in rooms the windows of which were not opened. On account of the poor construction of houses, however, resulting in cracks in floors and walls and loose-fitting doors and windows, most of the children were receiving abundant fresh air. Only about 6 per cent, in fact, were to be regarded as having insufficient fresh air at night; these children belonged to the families who lived in the better houses and were able to exclude fresh air by keeping windows closed. Improvement in the housing conditions of the community, therefore, sorely needed as it is, must be accompanied by education concerning the value of fresh air.

The greater number of children spent considerable time out of doors, even in the winter. More than three-fourths—79 per cent—averaged at least 2 hours a day in winter and 6 hours daily in summer. Some of the younger children, and older ones who had inadequate clothing, were out of doors less in the wintertime.

#### HABITS OF CLEANLINESS.

Somewhat more than half the children, 52 per cent, customarily washed their hands before meals; 47 per cent had neck and ears, face and hands washed daily. In the summer, when many of the children went swimming, bathing was more frequent; in winter, slightly more than three-fifths, 62 per cent, had a weekly bath. Of the remainder, 35 bathed once in two weeks in winter, 28 about once a month, and 33 even less than monthly. Twenty-six did not bathe at all in the

wintertime. "No, I don't wash them plumb off nary time, all cold weather," answered one mother. "I wash their feet, neck, and ear once a week." Another mother's answer to the question regarding winter bathing was, "I don't never do that in cold weather! wash their feet when they are going somewhere." Still another explained that when she had had a fireplace she had made it a rule to bathe the children twice a week, but now that they were living in a "little old open house" it was not easy and they were bathed less frequently.

It is easy to censure a community for upholding no higher standard of personal cleanliness, but in view of the cold houses, the lack of privacy, and all the difficulties involved in carrying and heating water for bathing, that so much was accomplished under such conditions seems surprising.

### CARE OF TEETH.

The children's teeth were very generally neglected. Eighty-two per cent of the children, 211, did not own a toothbrush, and only 14 of the 45 who did, brushed their teeth as frequently as once a day; 29 brushed them irregularly, and one confessed that although he had a brush he never thought to use it. A very few who owned no brushes made some attempt to clean their teeth occasionally in other ways. Three children of one family about weekly used dogwood brushes of their own making; two other children cleaned their teeth with cloths. Such irregular and ineffectual attempts are far from adequate, however, and may for the most part be disregarded. Less than 6 per cent of the children, the 15 who brushed their teeth as often as daily, may be considered as giving their teeth even a minimum of care.

The teeth were found to be in the condition which might be expected from this lack of care. Of the 149 children who were given physical examinations, 82 per cent had conspicuously dirty teeth. The 27 children not so described were chiefly the younger ones whose teeth had not had time to become much coated, and the few who regularly brushed their teeth.

Not only was lack of care shown by dirty teeth, but by decayed teeth as well. Of the children examined, 77.8 per cent were found to have one or more teeth decayed; 31 per cent of those 6 to 11 years of age had one or more permanent teeth in this condition.

### CONDITION OF THE CHILDREN'S BOWELS.

In a consideration of nutrition the condition of the bowels is important. Constipation not only may be the result of an unsuitable diet, but also may operate as a direct cause of undernutrition by decreasing the appetite and the total amount of food eaten.

It is interesting to note that not one mother reported that her child was constipated. Ten children were reported to be somewhat irregular, but 245, or 96 per cent of all the children studied, were, according to their mothers' statements, absolutely regular. The extremely plain diet, which often consisted largely of whole corn meal containing the bran, and was therefore laxative, together with abundant exercise in the open air and the simple, regular habits of living probably helped in no small measure to make constipation uncommon. It is also probable, however, that many mothers in reality knew little about their children's habits in this respect and that children became constipated without the mothers' knowledge and eventually began to feel sick from the effects. Then mothers, for the "sickness," not for constipation, gave some medicine—"black draught," perhaps to correct the evil. While fully 70 per cent of all the children were never given any medicine to assist bowel movement, 69 children—27 per cent—whenever they were sick were given a cathartic.

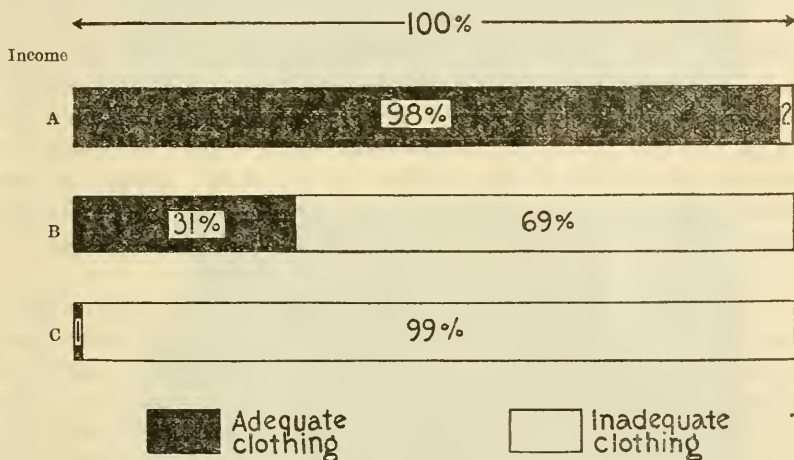


CHART VIII.—Clothing in relation to income.

### CLOTHING.

Inquiries regarding clothing were made to discover whether the children had garments which gave them adequate protection from the weather. Only three-fifths of the children were found to have at least the following: Shoes, an overcoat or other extra wrap, and some kind of winter underwear. Sometimes, however, the garments were so poor and thin that they could not possibly afford much warmth. Only about one-fourth of all the children, 27 per cent, were found to have clothing which could furnish adequate protection from the elements.

That poverty was largely responsible for this situation seems evident from Chart VIII, for it will be noted that almost all the chil-

dren (98 per cent) in the highest income group had adequate clothing, while practically the whole (99 per cent) of the lowest income group had clothing which was totally inadequate for winter wear.

### SCHOOLING.

The area studied comprised five school districts. Terms were short and attendance poor. Cold weather, inadequate clothing, distance from school, and the bad condition of the roads contributed to this poor attendance.<sup>13</sup> Many children lived a mile or more back in the mountains and the lanes which led to their homes were bad beyond description. It was often literally impossible for a child to trudge a mile or more in the thick, wet clay of the roads. Moreover, the numerous streams were commonly without bridges, and when swollen were too deep for a child to cross on foot.

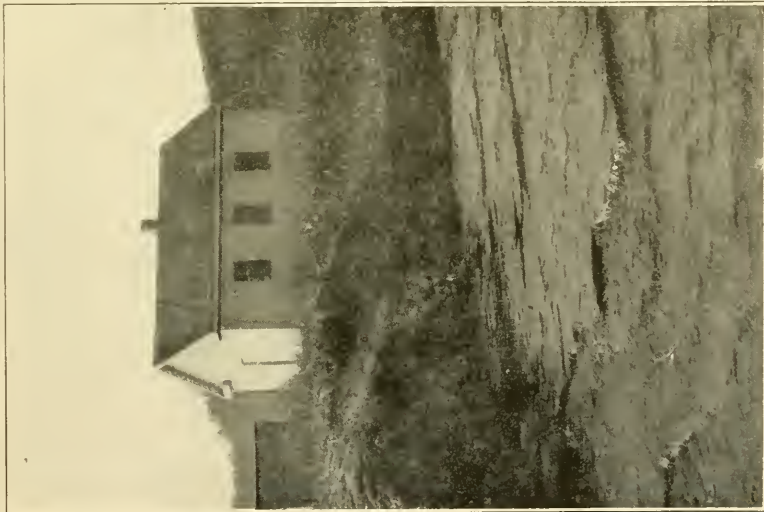
In one school district the only way for about half the children to get to school was by a road down which for some distance ran a creek, which they were obliged to wade. Even the schoolhouse was completely cut off from the road by a stream which, at the time of the study, was too wide for a child to jump across. A small board or a few stepping stones would have made it possible to cross dry shod, but no one had taken the trouble to provide either. It seemed certain that practically all the children in this school, during the rainy season, had to sit throughout the day with wet feet. Many mothers in the district kept their children at home when the creeks were swollen.

It has been found among city children that study outside of school, "home lessons" and music lessons chiefly, are often to a considerable extent responsible for undernutrition. The worry and the nervous strain resulting are a menace to health, and additional harm is done if by reason of home lessons the child is deprived of his right to play long hours daily in the open air. Of the children included in this investigation, only 45 were doing any studying at home, and these studied voluntarily and for short periods only.

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<sup>13</sup> The compulsory school attendance law of Kentucky in effect in rural school districts at the time of the study required all children between the ages of 7 and 12 years, inclusive, to be enrolled in and to attend some public or private day or parochial school each school year for the full term of said school, exempting only children taught at home and given equivalent instruction, and those not in proper physical or mental condition to attend school. The penalty for a parent's failure to cause his child to attend school as required by this law was a fine of not less than \$5 nor more than \$20 for each offense. The law also required that the school term should be not less than six months (120 days).





SCHOOL CUT OFF FROM ROAD BY CREEK.  
Children must wade this "moat" to get to the school-house.



VIEW OF A ROCKY MOUNTAIN ROAD.  
The road referred to over which the produce from an adjoining county must be hauled to market.





## SUMMARY AND CONCLUSIONS.

This study of a small mountain section of Kentucky included 123 families in which lived 256 children from 2 to 11 years of age. The heads of households in 103 families were farmers, but only 59 were occupied in farming alone, while 44 supplemented work on their farms by some other occupation.

### PHYSICAL CONDITION OF THE CHILDREN.

A total of 149 children were given physical examinations. Half this number had enlarged or diseased tonsils; more than a fourth showed symptoms of adenoids; over three-fourths had carious teeth. Only 7 per cent of the children were ranked excellent in nutrition; 18 per cent, good; 35 per cent, fair; 34 per cent, poor; and 6 per cent, very poor.

### HOME CONDITIONS.

The income in the homes of 42 children was considered adequate; in the homes of 95, its adequacy was doubtful; 119 children, or 47 per cent, were living in homes clearly incapable of providing the essentials of a simple standard of living. Sanitary facilities were poor; 56 per cent of the families had no toilet. More than half the families (55 per cent) depended for their water supply upon a spring, stream, open well, or other source which might suffer pollution.

The family food supply was restricted both in kind and amount and the family diet was in consequence monotonous and sometimes so limited as not to furnish all the elements necessary. Milk and whole corn meal were the redeeming features of the diet, but in many homes even the supply of milk was too limited, especially at certain periods, to insure an adequate diet, though 80 per cent of all the families kept one or more cows.

### THE DIET AND CARE OF THE CHILDREN.

Only 28 per cent of the children were having a diet which probably included all the constituents necessary to nourish their bodies, provided enough was eaten and the body was able to utilize it. The diets of 27 per cent were clearly inadequate for the needs of growing children. In other words, nearly three-fourths of the children were living on diets of either doubtful adequacy or certain inadequacy.

Fruit and vegetables occupied a minor place in the children's dietary; beans were the predominating vegetable; wild blackberries were practically the only fruit, either fresh or canned, ~~54 per cent~~ of the children had. Eggs were almost entirely absent from the winter diet and even at the time of greatest yield were eaten by only ~~62 per cent~~ of the children as often as twice a week. Seventy-seven per cent of the children had meat daily or oftener, but since meat in this community was usually fat salt meat it made a very questionable contribution to the protein in the dietary. It was estimated that 72 per cent of the children had at least a pint of milk daily; 70 per cent had corn bread made of whole corn meal or biscuits made of bolted white flour. Coffee was used by 55 per cent of the children, though only 34 per cent drank it four or more times a week. Eating between meals was indulged in by 43 per cent to such an extent as probably to be harmful.

Of the children in the highest income group, 74 per cent, as compared with only 12 per cent in the lowest, were receiving diets which could be considered adequate. The diet grades corresponded closely to the nutrition grades as revealed by the physical examinations.

Chiefly because of the early rising hour, but 45 per cent of the children were having sufficient hours of sleep. Only a little more than a fourth of the children had clothing which could be considered sufficient to furnish adequate protection from the elements. Care of the teeth was very generally neglected.

#### POSSIBILITIES OF IMPROVEMENT.

There is urgent need in the community studied for improvement in the conditions affecting the health and welfare of children. In order to better the physical condition of the children, adequate diets, improved housing, more adequate clothing, and higher standards of general hygiene are essential.

If the diet of the children is to be improved, the family food supply must be enlarged. This will involve increase in the amount and quality of milk; improvement of gardens; raising and canning or drying more vegetables; greater utilization of the wild blackberries, until fruit culture can be developed; and increase in the yield of eggs until enough are available both for family consumption and for selling. The use of meat could in many cases be restricted without harming the diet. The use of sorghum and the use of beans, particularly those dried without removing the pods, could well be extended.

Soil improvement and education in better farming methods would improve economic conditions and dietaries. Better housing, more adequate clothing, and generally higher standards of living would follow. Instruction of the mothers and fathers in the health needs and care of children is also essential.

In such a program a county agricultural agent, a county home demonstration agent or nutrition specialist, and a county public health nurse could render valuable service. Education in diet and hygiene through the public school would also be of assistance. At the time of the study the county had an agricultural agent on part time, and much had been accomplished through his efforts. The territory covered was too large, however, and a full-time agent could be employed with advantage.





STATE

Sym.      31. Control of parents (spec.).

Sym.

D. Family. 32. Ch. Under 2.    2-5.    6-11.    12-14.  
Over 14.    F. M. Total    oth. ad.    ch.    Total h. h.

33. Financial status: (a) Farmer, oth. (spec.).    Income  
(b) Farm: Acres    cult.    OT (U.S.) H. wages  
(c) Stock: Cattle    milch c.    hogs    horses  
   mules    sheep    chickens  
(d) Ev. prosp: Tel, auto, h. help, sew-m, piano, victrola.  
   oth. (spec.).  
(e) Ev. poverty:

34. Housing: (a) No. rooms    Used for sleeping.  
(b) Edn. N. piles, oth. (spec.).  
(c) Close fitting doors and windows N.  
(d) Walls and ceiling: Plas. ceiled, oth. (spec.).

35. Heating: Furn., stove, firepl.    Cook: stove, firepl.

36. Sanitation: (a) Toilet. N. privy, oth. (spec.).  
(b) Water: Dug w., drill, w., spr., str., oth. (spec.).

|                      |      |                      |
|----------------------|------|----------------------|
| 30. Coffee or tea: N | Cups | strong, weak (M. W.) |
| Habit since          | age  |                      |

37 Milk (a) Source: Own cows; buy, amt.  
(b) Yield, pres. used.  
Max. period. used.  
Min. period. used.  
(c) Cows all dry, N. period.  
Milk supply: None; buy fr. amt.  
(Can'd (spec. kind.) powdered.)

c) Orth. veg. used. W.  
Orth. veg. used. S.

57901W













